IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): He, et al. Application No.: 10582820 Filed: 10/8/2008 Title: Single Molecule Detection Using Molecular Motors Attorney Docket No.: 60224US	Confirmation No. **7416** Art Unit: 1634 Examiner: SISSON, BRADLEY L

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PROPOSED RESPONSE UNDER 37 CFR 1.111 FOR DISCUSSION PURPOSES

Dear Commissioner:

Applicants extend their thanks to Examiner Sisson for agreeing to schedule a telephone interview in this matter on June 15, 2011 at 1 pm ET. In response to the Office Action of April 6, 2011, the following amendment is presented for discussion purposes.

Amendments to the Claims begin on page 2 of this paper.

Remarks/Arguments begin on page 6 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A method for detecting ~~a~~ at least one target nucleic acid comprising:

(a) providing first and second target-specific nucleic acids, wherein the first and second target-specific nucleic acids each comprise sequences complementary to the target nucleic acid; wherein the first and second target-specific nucleic acids are specific only for a selected ~~one of the at least one~~ target nucleic acid of interest; wherein the first target specific nucleic acid is bound to a first affinity tag and the second target-specific nucleic acid is bound to a second affinity tag, wherein the first affinity tag is capable of binding to a molecular motor, wherein the molecular motor includes ~~consists essentially of~~ a biological or synthetic molecule capable of induced translational or rotational movements that are capable of detection, wherein the second affinity tag is capable of binding to a detection probe that includes ~~consisting essentially of~~ a metal nanorod;

(b) contacting the first and second target-specific nucleic acids to a sample under conditions whereby the first and second target-specific nucleic acids will hybridize to the at least one target nucleic acid if the at least one target nucleic acid is present in the sample, wherein ligation reaction requires the formation of ~~upon hybridization to the target nucleic acid the first and second target-specific nucleic acids are~~ juxtaposed ~~at~~ 5' phosphate and 3' hydroxyl termini of two adjacent target-specific nucleic acids which are hybridized to the complementary target nucleic acid;

(c) upon hybridization to the target nucleic acid, ligating the first and second target-specific nucleic acids together;

(d) binding the molecular motor to the first affinity tag and the detection probe to the second affinity tag;

(e) inducing translational or rotational movement of the molecular motor; and

(f) detecting translational or rotational movement of the molecular motor by observing ~~through~~ the detection probe ~~regularly~~ moving as indicated by a changing light intensity ~~color~~, wherein the ~~motor~~ translational or rotational movement of the molecular motor indicates the presence of ~~serves to detect~~ the target nucleic acid in the sample, and where observation of ~~ATP-dependent rotation~~ of changing light intensity of different colored nanorods indicates the presence of a corresponding target nucleic acid each having its unique probe attachment or different motors causing different specific motor-induced motion so as to allow determination ~~of~~ that an assortment of different target nucleic acid(s) is/are present in any given sample.

Claim 2 (original): The method of claim 1 wherein the method further comprises generating a plurality of ligation products following step (c) using ligation chain reaction.

Claim 3 (currently amended) The method of claim 1 wherein the molecular motor comprises ~~consists essentially of~~ ~~an~~ F1-ATPase.

Claims 4-6 (canceled).

Claim 7 (currently amended): The method of claim [[5]] 1, wherein the changing light intensity ~~the detecting~~ comprises ~~determining~~ an oscillation of intensity of light at one or more wavelengths ~~from the detection probe~~.

Claim 8 (new): The method of claim 1 wherein observing the detection probe ~~oscillating~~ moving as indicated by a changing light intensity comprises monitoring the oscillation of light intensity of a plurality of wavelengths ~~red and green light~~.

Claim 9 (new): The method of claim 1 wherein observing the detection probe oscillating as indicated by a changing light intensity comprises monitoring the oscillation of intensity of light of only one wavelength.

Claim 10 (new): A method for detecting at least one target nucleic acid comprising:

(a) providing first and second target-specific nucleic acids, wherein the first and second target-specific nucleic acids each comprise sequences complementary to the target nucleic acid; wherein the first and second target-specific nucleic acids are specific only for a selected target nucleic acid of interest; wherein the first target specific nucleic acid is bound to a first affinity tag and the second target-specific nucleic acid is bound to a second affinity tag, wherein the first affinity tag is capable of binding to a molecular motor, wherein the molecular motor includes a biological or synthetic molecule capable of induced translational or rotational movement that are capable of detection, wherein the second affinity tag is capable of binding to a detection probe that includes a metal nanorod;

(b) contacting the first and second target-specific nucleic acids to a sample under conditions whereby the first and second target-specific nucleic acids will hybridize to the at least one target nucleic acid if the at least one target nucleic acid is present in the sample, wherein ligation reaction requires the formation of juxtaposed 5' phosphate and 3' hydroxyl termini of two adjacent target-specific nucleic acids which are hybridized to the complementary target nucleic acid;

(c) upon hybridization to the target nucleic acid, ligating the first and second target-specific nucleic acids together;

(d) binding the molecular motor to the first affinity tag and the detection probe to the second affinity tag;

(e) inducing translational or rotational movement of the molecular motor; and

(f) detecting translational or rotational movement of the molecular motor by using dark field microscopy for observing the detection probe's translational or rotational movements as indicated by a changing light intensity, wherein the induced changing light intensity indicates the presence of the target nucleic acid in the sample, and where observation of rotation of different colored nanorods indicates the presence of a corresponding target nucleic acid each having its unique probe attachment or different motors causing different specific motor-induced motion so as to allow determination of an assortment of different target nucleic acid(s) is/are present in any given sample.

Claim 11 (new): The method of claim 10 wherein observing the detection probe oscillating as indicated by a changing light intensity comprises monitoring the changes in light intensity of a plurality of wavelengths.

Claim 12 (new): The method of claim 10 wherein observing the detection probe oscillating as indicated by a changing light intensity comprises monitoring the oscillation of intensity of light of only one wavelength.

REMARKS

Claim Objections

The office has objected to Claims 5-7 under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. In response claims 4 -6 have been canceled and claim 7 has been amended. New claims 8-12 have been added. Applicant respectfully submits that the new and amended claims comply with 37 CFR 1.75(c) and are now in condition for allowance. Consideration of the amended claims is requested.

Claim Rejections - 35 USC § 112

Claim(s) 1-7 are pending in the application. Claims 1-7 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Claims 4-6 have been canceled. Applicant respectfully traverses the rejection of claims 1-3 and 7 in view of the arguments and amendments herein.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone George A. Leone, Applicants' Attorney at 253-682-0246 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

June 10, 2011
Date

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